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ABSTRACT

A study examined aspects of the acquisition of spatialized morphology and syntax in American Sign Language (ASL) learned natively by deaf children of deaf parents. Children aged 2 to 8 were shown story books to elicit narratives, and the resulting use of verbs contained morphological forms not appearing in adult grammar. Analysis of the creative errors in this class of verbs suggests that in acquiring the spatial syntactic system of ASL, the children are faced with the problem of learning a class of verbs incorporating body classifiers--with special requirements regarding complementation and reference. Until the interaction of this verb class with the morpho-syntactic subsystems in the language is mastered, the children use the verbs incorrectly but use other linguistic devices available to them, such as word order and innovative use of the principle of spatial contrast. (MSE)

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MORPHOLOGICAL INNOVATION IN THE ACQUISITION OF AMERICAN SIGN LANGUAGE

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Morphological Innovation in the Acquisition of American Sign Language

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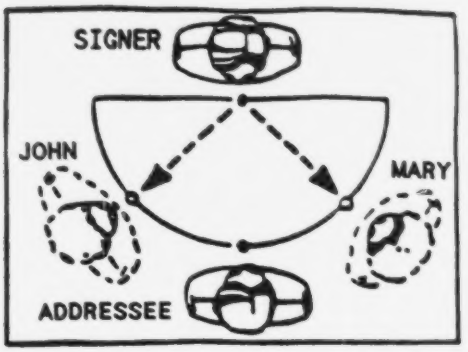
American Sign Language is the visual-gestural language used by deaf people in the United States and parts of Canada. It is acquired as a native language by deaf children of deaf parents. More than a decade of research has shown that, in general, the milestones of language acquisition are reached at the same points in the maturational timetable for deaf children acquiring ASL as for hearing children learning a spoken language of the same general morpho-syntactic type (see Newport and Meier (1986) and references there).

The syntax of ASL crucially makes use of the spatial medium in which the language has developed. Nominals are associated with arbitrary points (referential loci) in the signing space, and verb signs show agreement with their arguments by moving between these loci. Among the mechanisms that associate a nominal with a locus is indexing: the nominal is followed by a point to an arbitrarily-selected locus in the signing space. For example,the sequence JOHN $INDEX_a$, MARY $INDEX_b$ establishes John and Mary at loci a and b, respectively (see figure 1a). $_aGIVE_b$, with movement between loci a and b, means 'John gives Mary'; $_bGIVE_a$ means 'Mary gives John' (see Meier (1982) for a full description of notation).

We refer to the system described above as the Fixed Referential System, because the loci for referents, once established, remain relatively constant throughout a stretch of discourse. It is possible, however, to shift this referential frame, so that loci are reassociated with new referents. This shift is signaled through a change in posture or eyegaze. Under the Shifted Reference System, verb agreement or pronominal signs directed to or from the signer's locus have third-person, rather than first person, reference. (Figure 1b)

Our lab has been researching the development of syntax, discourse and narrative in deaf children of deaf parents, who are acquiring ASL as a native language. The data presented here come entirely from narratives by deaf children of deaf parents, between the ages of two and eight. The narratives were collected from a total of 24 children, and are part of our larger study of the acquisition of spatialized morphology and syntax.

The narratives were elicited with the use of specialized story books, containing pictures but no words. Each child was asked to look at the story book, page by page, and describe what was happening in each picture. Then the book was taken away, and the child was asked to tell the entire story again. The data in this paper are from the children's narratives done without the book. The storybook we used showed a boy and a girl sitting at a table, painting pictures. The boy slaps paint on the girl's face, and then the girl slaps paint on the boy's face. The boy pours a cup of water on the



INDEX$_a$ 'JOHN' INDEX$_b$ 'Mary'

a) Nominal Establishment

FIXED FRAMEWORK 1/a SHIFT 1/b SHIFT

b) Fixed and Shifting Referential Framework

Figure 1. Aspects of Spatialized Syntax in ASL

girl's head, and the girl then pours water on the boy's head. Their mother, who has had her back to them throughout the sequence, now sees what they are doing and scolds them. The storybook is used to elicit a number of things, including a particular class of verbs which present an interesting test of the child's developing mastery of the spatialized syntax of ASL.

Surprisingly, in examining the children's use of these verbs, we found morphological forms which do not appear in the adult grammar at all, yet which were widespread in the children's signing. Of the 24 children from whom we have elicited stories, eight used these novel forms (described below). This phenomenon is of interest for the insight it can give us into the sorts of hypotheses that deaf children acquiring ASL develop as they acquire the spatialized underpinnings of the grammar, and as they integrate them into a coherent system. Completely novel forms may also provide an opportunity to see underlying principles of the grammar instantiated in ways which are never seen in the adult language; it may be that the children have not yet acquired the additional principles which rule these forms out.

We will first present the narrative as an adult might do it, contrasting that with the way many of the children generally signed it. We will then proceed to the novel verb forms which we have found, and explain how and why they differ from any existing morphological forms in adult ASL.

For an adult signer, the narrative might begin with an ASL sentence conveying the idea that a boy and a girl were playing with paints. In adult ASL, this would involve establishing loci for each of the characters, by signing e.g., BOY INDEX-a, GIRL INDEX-b. This might well be followed by a two-sentence string such as: BOY $_{a}$PAINT$_{b}$ GIRL, PAINT-FACE[1/b shift] // GIRL $_{b}$PAINT$_{a}$ BOY, PAINT-FACE[1/a shift]. (The first sentence is illustrated in figure 2a). Note the spatial reference shift on the sign PAINT-FACE in each sentence. Many of the children at or below age 5 described this situation with such sentences as: *BOY PAINT-FACE GIRL // *GIRL PAINT-FACE BOY. The reasons for the unacceptability of these constructions will be discussed shortly.

In an adult version, the story might well continue as follows: WATER, BOY $_{a}$POUR$_{b}$ GIRL, SPILL-OVER-HEAD[1/b shift] // GIRL $_{b}$POUR$_{a}$ BOY, SPILL-OVER-HEAD[1/a shift]. Note again the use of referential shift, with the sign SPILL-OVER-HEAD. Many of the children in our study, up to approximately age 5, signed the sequence as: *BOY POUR-ON-HEAD SPILL-OVER-HEAD GIRL // *GIRL POUR-ON-HEAD SPILL-OVER-HEAD BOY. Again, this is incorrect from the point of view of the adult grammar.

One clear difference between the adult and child versions of the story is that, while the adult version includes spatial agreement morphology on the verbs PAINT and POUR, the children's narratives were almost entirely lacking in this sort of spatial morphology. Surprisingly, many of the children nevertheless used spatial distinctions in the forms of verbs to contrast between the two referents--distinctions in form quite different from those used by adults. In describing the boy painting the girl's face, several of

a) BOY $_{a}$PAINT$_{b}$ GIRL PAINT-FACE$_{[1/b\ shifted]}$

b) *BOY PAINT-FACE GIRL

Figure 2 'The boy paints the girl's face' a) Correct signed version of sentence. b) Incorrect version signed by several children.

the children signed *BOY PAINT-FACE(right side) GIRL (figure 2b). For the girl painting the boy's face, these same children signed *GIRL PAINT-FACE(left side) BOY. That is, they used the right and left sides of the face to contrast the two referents. This is not correct in adult ASL.

We also found the distinction used by some children with the verbs POUR and SPILL-OVER-HEAD; for example, 'The girl pours water on the boy's head and it spills over his head' was signed as *GIRL POUR-ON-HEAD(left side) SPILL-OVER-HEAD(left side) BOY. In addition, some children used what appeared, in context, to be a novel reciprocal form. ASL has a reciprocal form of the sign PAINT, but it is not possible to apply reciprocal morphology to the sign PAINT-FACE. Nevertheless, some of the children in our study did produce the novel sign *PAINT-FACE[Reciprocal] (figure 3).

These forms are especially interesting because of their novelty. Previous studies (Meier 1982) have documented overgeneralization of morphological forms by deaf children; these have taken the form of using existing morphological operations with inappropriate lexical items. Overgeneralizations of verb agreement, dual inflection and nominalizing morphology are all attested. The situation here, however, is rather different. There are no verbs in adult ASL which use different parts of the body for different referents. The children's forms thus do not represent simply overapplication of an attested morphological operation; they are completely innovative. At the same time, these forms do seem to be based on principles which underlie the spatial morphology of adult ASL. The children are evidently aware that distinctions in reference are generally indicated by means of some contrast or other in the spatial properties of the sign. The children are thus taking a basic organizational principle of ASL's spatial morphology and giving it a novel instantiation.

In terms of the overall course of development, these innovative forms first appear at about age 3; that is, at the age at which children have good comprehension of the system of nominal establishment (assigning referents to loci) (see Lillo-Martin et al., 1985), and only six months ahead of the age at which the acquisition of verb agreement is generally considered to be complete (Newport and Meier 1986). The children stop using these innovative forms approximately at age 5;6.

The question to be answered now is in what way the children's usage is incorrect from the point of view of the adult grammar. The children's signing in these narratives differs from the adults' in at least two ways: First, the children use verbs which could be described as 'intransitive' as if they were ordinary transitive verbs, and, second, they use morphological forms--the contrast between the sides of the head for different referents--which do not appear in adult signing. We will argue that these facts are related. We will first discuss the problem of transitivity.

Essentially, some of the verbs which, in the children's signing take overt nominal objects, cannot have such complements in the adult grammar. Verbs with incorporated body parts as objects, such as PAINT-FACE and SPILL-OVER-HEAD do not take overt noun phrases as

PAINT[Reciprocal]

*PAINT-FACE[Reciprocal]
'Paint each others faces'

Figure 3. Correct and novel reciprocal forms.

objective complements in ASL. While it is correct to sign 'The boy paints the girl's face' as BOY $_{a}$PAINT$_{b}$ GIRL PAINT-FACE[1/b shift], it is not grammatical to sign *BOY PAINT-FACE GIRL. The sign PAINT-FACE does not take an overt nominal as an object. Similarly, it is not grammatical, in the adult language, to sign *BOY POUR-OVER-HEAD SPILL-OVER-HEAD GIRL; the sign SPILL-OVER-HEAD never takes a noun phrase as object. Rather, the objects are already included in the verbs themselves, in the form of body classifiers.

The use of verbs which incorporate body classifiers has been partially described in Supalla (1982). With certain verbs, locations on the signer's body can be used to refer to equivalent locations on the referent's body. Supalla noted that different locations on the body can refer to different parts of the same referent, but not to different referents. "If subsequent verbs refer to another referent object, the signer must shift his body to a new place in the signing space in order to use it as another body marker [body classifier]; a second referent object cannot be marked by the body marker in the same location, even when nouns prior to the verbs make the distinctions between the two referents clear" (Supalla (1982) p. 32). In other words, verbs such as PAINT-FACE which incorporate body classifiers are marked for distinct referents by means of the system of Shifting Spatial Reference described above, and it is not permissible to assign different parts of the body classifier, such as the sides of the face and head, to distinct referents.

The children's use of verbs which incorporate a body classifier, such as PAINT-FACE and SPILL-OVER-HEAD, is thus unlike the adult usage in several ways. Until shortly after age 5, the children fail to observe the restriction that such verbs do not take separate overt objects, they omit the required use of Shifting Spatial Reference to mark different referents, and some of the children use the innovative verb forms described earlier. Yet it is interesting to note that in other respects, these same children have largely acquired the adult syntax. As stated above, verb agreement is generally considered to be fully acquired by age 3;6. The system of nominal establishment is fully comprehended by age 3, and in this study we found it beginning to be used productively by age 4;6. The use of Shifting Spatial Reference appears at or just before age 5 for some of the children. In general, then, the children have a good command of ASL's spatialized morphology and syntax.

It is interesting to note, however, that the children described in this study do not yet have mastery of the use of Shifting Spatial Reference with verbs incorporating body classifiers. Below the age of 5;6, we found no instances of the use of shifted reference with verbs such as PAINT-FACE and SPILL-OVER-HEAD, and numerous omissions of shift in contexts in which it is required--this despite the use of shifted reference in other contexts within the narratives. The indication is that the children below age 5;6, despite having largely acquired the adult syntax, have not yet fully mastered the use of verbs incorporating body classifiers. Their use of such verbs contains errors in complementation (the use of overt nominal objects) and referential marking (the omission of referential shift), and their incomplete understanding of the use of this class of verbs is

further exemplified by their incorrect assignment of different parts of the body classifier to distinct referents--the use of innovative morphological forms. As they learn the intricacies of this verb class, all of these errors disappear from their signing, including the innovative morphological forms.

In conclusion, the study of children's creative errors in the acquisition of this class of verbs provides insight into both the acquisition of ASL's spatialized syntax and into the acquisition strategies which children have available to them generally. In acquiring the spatial syntactic system of ASL, the children are faced with the problem of learning a class of verbs--the verbs incorporating body classifiers--with special requirements regarding complementation and reference. Until the interaction of this verb class with the morpho-syntactic sub-systems in the language (such as the system of Shifting Spatial Reference) is mastered, the children use these verbs incorrectly, but meanwhile make use of other linguistic devices which are available to them, such as word order and the innovative use of the principle of spatial contrast.

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